JOURNAL OF THE ASSOCIATION FOR COMPUTING MACHINERY

VOLUME 27 • 1980

MICHAEL R. GAREY
Editor-in-Chief
Rm 2C-371
Bell Telephone Laboratories, Inc.
600 Mountain Avenue
Murray Hill, NJ 07974
201 582-4415

MARK S. MANDELBAUM
Executive Editor
ACM Headquarters
1133 Avenue of the Americas
New York, NY 10036
212 265-6300

Area Editors

EDWARD G. COFFMAN, JR.
Bell Telephone Laboratories, Inc.
600 Mountain Avenue
Murray Hill, NJ 07974
(Operating Systems)

NILS NILSSON
SRI International
Menlo Park, CA 94025
(Artificial Intelligence)

STANLEY C. EISENSTAT
Department of Computer Science
Yale University
P.O. Box 2158
New Haven, CT 06520
(Numerical Computation)

BARRY ROSEN
IBM Thomas J. Watson Research Center
P.O. Box 218
Yorktown Heights, NY 10598
(Programming Languages and Methodology)

MICHAEL J. FISCHER
Department of Computer Science
University of Washington
Seattle, WA 98105
(Algorithms and Complexity Theory)

KENNETH STEIGLITZ
Department of Computer Science
Princeton University
Princeton, NJ 08540
(Operations Research)

MICHAEL HARRISON
Department of Computer Science
University of California, Berkeley
573 Evans Hall
Berkeley, CA 94720
(Formal Languages and Models of Computation)

HAROLD S. STONE
Department of Electrical and Computer Engineering
University of Massachusetts
Amherst, MA 01002
(Computer Organization and Design)

RICHARD R. MUNTZ
Computer Science Department
University of California, Los Angeles
Room 3732 Boelter Hall
Los Angeles, CA 90024
(Computer System Modeling and Analysis)

ROBERT E. TARJAN
Computer Science Department
Stanford University
Stanford, CA 94305
(Combinatorics and Graph Theory)

JEFFREY D. ULLMAN
Computer Science Department
Stanford University
Stanford CA 94305
(Database Theory and Data Structures)

PUBLISHED BY THE ASSOCIATION FOR COMPUTING MACHINERY

Copyright © 1980, Association for Computing Machinery, Inc., 1133 Avenue of the Americas, New York, NY 10036

ARTIFICIAL INTELLIGENCE	599	Alan R. Aronson, Barry E. Jacobs, and Jack Minker—A Note on Fuzzy Deduction
	403	Derek C. Oppen—Reasoning About Recursively Defined Data Structures
COMBINATORICS AND GRAPH THEORY	412	Doris Altenkamp and Kurt Mehlhorn—Codes: Unequal Probabilities, Unequal Letter Costs
	428	Ronald L. Graham, Andrew C. Yao, and F. Frances Yao—Information Bounds are Weak in the Shortest Distance Problem
	604	D.T. Lee—Two-Dimensional Voronoi Diagrams in the *Lp*-Metric
	1	Andrzej Proskurowski—On the Generation of Binary Trees
	445	Yossi Shiloach—A Polynomial Solution in the Undirected Two Paths Problem
	3	Marvin Solomon and Raphael A. Finkel—A Note on Enumerating Binary Trees
	619	Shuji Tsukiyama, Hiromu Ariyoshi, Isao Shirakawa, and Hiroshi Ozaki—An Algorithm to Enumerate All Cutsets of a Graph in Linear Time per Cutset
	207	Andrew Chi-Chih Yao—New Algorithms for Bin Packing
COMPUTATIONAL STRUCTURES	60	Peter B. Henderson and Yechezkel Zalcstein—Synchronization Problems Solvable by Generalized PV Systems
COMPUTER SYSTEMS	6	David Nassimi and Sartaj Sahni—An Optimal Routing Algorithm for Mesh-Connected Parallel Computers
	402	R. Parchmann—Corrigendum on "Control System Model for Critically Timed Sources"
	30	Krzysztof Pawlikowski—Message Waiting Time in a Packet Switching System
	228	M. Pease, R. Shostak, and L. Lamport—Reaching Agreements in the Presence of Faults
	42	G. Boyd Swartz—Polling in a Loop System
	457	Kishor S. Trivedi, Robert A. Wagner, and Timonthy M. Sigmon—Optimal Selection of CPU Speed, Device Capacities, and File Assignments
DATA STRUCTURES AND ALGORITHMS	81	Richard J. Lipton, Arnold L. Rosenberg and Andrew C. Yao—External Hashing Schemes for Collections of Data Structures
	474	Haim Mendelson and Uri Yechiali—A New Approach to the Analysis of Linear Probing Schemes
DATABASE THEORY	656	A. Ehrenfeucht and G. Rozenberg—The Sequence Equivalence Problem is Decidable for 0S Systems
	664	David Maier—Minimum Covers in the Relational Database Model
	235	Raymond Reiter—Equality and Domain Closure for First-Order Databases
	250	Yehoshua Sagiv—An Algorithm for Inferring Multivalued Dependencies with an Application to Propositional Logic
	633	Yehoshua Sagiv and Mihalis Yannakakis—Equivalences Among Relational Expressions with the Union and Difference Operators
	72	Abraham Silberschatz and Zvi Kedem—Consistency in Hierarchical Database Systems
FORMAL LANGUAGES	484	Fred G. Abramson, Yuri Breitbart, and Forbes D. Lewis—Complex Properties of Grammars
	96	Joost Engelfriet, Erik Meineche Schmidt, and Jan Van Leeuwen—Stack Machines and Classes of Nontested Macro Languages
	499	J. Engelfriet and G. Rozenberg—Fixed Point Languages, Equality Languages, and Representation of Recursively Enumerable Languages

	675	S.A. Greibach and E.P. Friedman—Superdeterministic PDAs: A Subcase with a Decidable Inclusion Problem
NUMERICAL COMPUTATION	701	J.T. Schwartz—Fast Probabilistic Algorithms for Verification of Polynomial Identities
	263	G.W. Wasilkowski—Can Any Stationary Iteration Using Linear Information be Globally Convergent?
OPERATING SYSTEMS	270	Tiko Kameda—Testing Deadlock-Freedom of Computer Systems
OPERATIONS RESEARCH	281	We-Min Chow—The Cycle Time Distribution of Exponential Cyclic Queues
	519	G. Fayolle, I. Mitrani, and R. Iasnogorodski—Sharing a Processor Among Many Job Classes
	718	Marshall L. Fisher and Dorit S. Hochbaum—Database Location in Computer Networks
	287	Teofilo F. Gonzalez and Donald B. Johnson—A New Algorithm for Preemptive Scheduling of Trees
	118	Ravindran Kannan—A Polynomial Algorithm for the Two-Variable Integer Programming Problem
	533	Christos H. Papadimitriou and Paris C. Kanellakis—Flowshop Scheduling with Limited Temporary Storage
	736	K.G. Ramakrishnan—Solving Two-Commodity Transportation Problems with Coupling Constraints
	313	M. Reiser and S.S. Lavenberg—Mean Value Analysis of Closed Multichain Queuing Networks
	550	Sartaj Sahni and Yookun Cho—Scheduling Independent Tasks with Due Times on a Uniform Processor System
	323	Don Towsley—Queuing Network Models with State-Dependent Routing
PROGRAMMING LANGUAGES AND METHODOLOGY	123	Richard A. DeMillo, Stanley C. Eisenstat, and Richard J. Lipton—Space-Time Trade-Offs in Structured Programming: An Improved Combinatorial Embedding Theorem
	758	Peter J. Downey, Ravi Sethi, and Robert Endre Tarjan—Variations on the Common Subexpression Problem
	128	Marc A. Kaplan and Jeffrey D. Ullman—A Scheme for the Automatic Inference of Variable Types
	338	Ramachandran Krishnaswamy and Arthur B. Pyster—On the Correctness of Semantic-Syntax-Directed Translations
	356	Greg Nelson and Derek C. Oppen—Fast Decision Procedures Based on Congruence Closure
	146	Bhaskaram Prabhala and Ravi Sethi—Efficient Computation of Expressions with Common Subexpressions
	772	Jean-Claude Raoult and Jean Vuillemin—Operational and Semantic Equivalence Between Recursive Programs
	580	Ravi Sethi and Adrian Tang—Constructing Call-by-Value Continuation Semantics
	164	Mitchell Wand—Continuation-Based Program Transformation Strategies
	365	Stephen A. Ward and Robert H. Halstead, Jr.—A Syntactic Theory of Message Passing
SWITCHING THEORY	181	Edward A. Bender—The Number of Fanout-Free Functions with Various Gates
THEORY OF COMPUTATION	384	Harold Abelson—Lower Bounds on Information Transfer in Distributed Computation

797 Gérard Huet—Confluent Reductions: Abstract Properties and Applications to Term Rewriting Systems

822 Joseph Ja' Ja'—Computation of Bilinear Forms over Finite Fields

831 Richard E. Ladner and Michael J. Fischer—Parallel Prefix Computation

393 David Lichtenstein and Michael Sipser—GO is Polynomial-Space Hard

839 Rüdiger Reischuk—Improved Bounds on the Problem of Time–Space Trade-Off in the Pebble Game

191 Norihisa Suzuki and David Jefferson—Verification Decidability of Presburger Array Programs